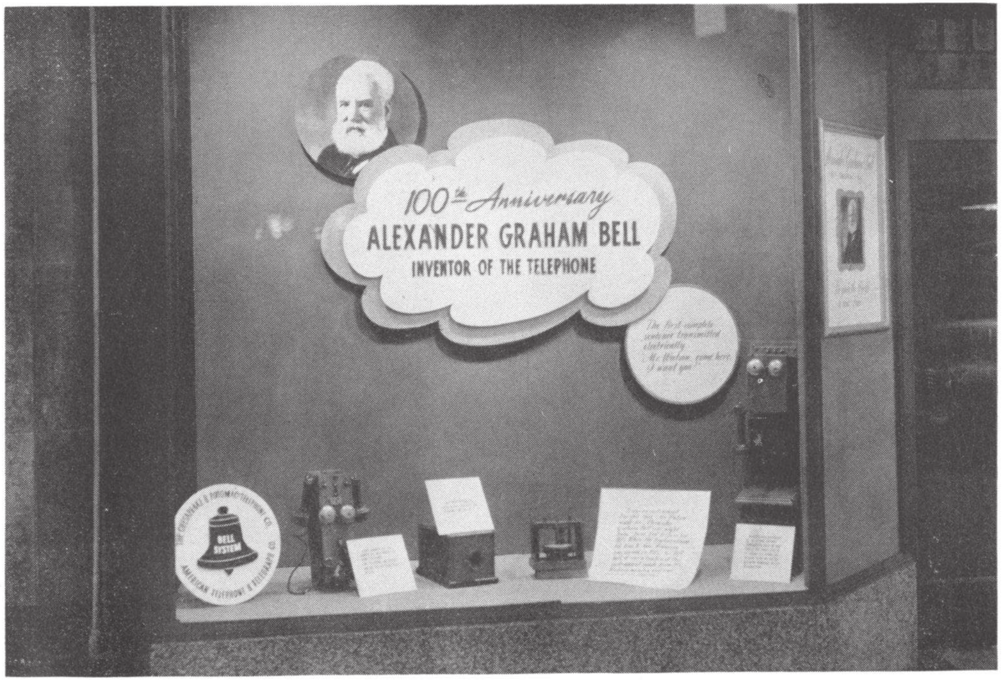
100th Anniversary
ALEXANDER GRAHAM BELL
INVENTOR OF THE TELEPHONE
BELL SYSTEM
THE CHESAPEAKE & POTOMAC TELEPHONE CO.
AMERICAN TELEPHONE & TELEGRAPH CO.

ALEXANDER GRAHAM BELL (1847–1922) AND TYPES OF EARLY TELEPHONE INSTRUMENTS

AN INTERVIEW WITH ALEXANDER GRAHAM BELL

BY

OLIVER MARTIN

On a May night in 1921 I was walking through Dupont Circle in Washington, on my way to the home of Dr. Alexander Graham Bell. He had promised me an interview for *The Transmitter*. Need I say that I was looking forward with great interest to seeing and talking with the inventor of the telephone? And need I add that I was not disappointed?

"Come around after dinner tonight, the later the better," said his secretary over the telephone that afternoon. It was good news that the appointment was set for a late hour; it meant that Dr. Bell would give me more time than if he had asked me to call in the late afternoon or early evening. I went at 11 P. M.

We talked briefly about the telephone and then I asked him to tell me something about his other inventions.

"Well," he said, "I think a mention of the photophone, the induction balance and the telephone probe would probably interest your readers. The photophone is really the first wireless telephone ever invented, and the word means sound by light—that is, a sound which travels over a beam of light.

"I tried it out from the top of the Franklin School, here in Washington, and it transmitted sound perfectly. Although it has never come into general use, it has been used between lighthouses."

Dr. Bell told me that he had also invented the spectrophone, the thermophone, the radiophone and the actinophone.

"I wonder if those words ever got into the dictionaries," he mused. There was a dictionary close by and then and there we looked up the words, and the famous scientist was visibly pleased when he found them.

"The induction balance is well known now," he continued. "I developed it to locate bullets or other bits of metal that might be imbedded in the body. I remember that I used to practice on an old veteran at the Soldiers' Home. He had a bullet in his body for years and I had no difficulty in locating it. When we passed the induction balance over the place where the bullet was we would get a sonorous tone.

"The induction balance was used to try to locate the bullet fired by the assassin of President Garfield, but the test indicated that the President was literally spattered with bullets, which, of course, wasn't true.

"I didn't make the test, but was later consulted with a view to finding out what was wrong. I discovered that when the test was made the President lay on a bed with steel springs. It was the steel springs that registered, and not bullets. Of course, the X-ray has superseded the induction balance in connection with surgery.

"The telephone probe is still used and is simply a needle arranged with a head-telephone worn by the surgeon. He inserts the needle into the flesh where the metal is supposed to be imbedded and when it comes in contact there is a click in the receiver."

Being an individual who doesn't enjoy having needles stuck into him, I asked: "But didn't you have difficulty in finding subjects to experiment on?"

Dr. Bell's kindly eyes twinkled with amusement. "Oh, no. We simply imbedded a bit of metal in a leg of mutton and probed to our hearts' content."

The inventor of the telephone probe said it was his belief that he was the first to suggest radium for the cure of cancer. Shortly after Madame Curie made her wonderful discovery, Dr. Bell wrote to a doctor in Washington that radium probably would be effective in the treatment of cancer, and suggested that the radium be enclosed in a glass tube and placed in the cancer.

"I once saved Mme. Curie from possible injury," he observed. "It was in Paris, in 1900, I believe. The Shah of Persia was visiting Paris at the time and he always rode about the city accompanied by a troop of horsemen. They were wild riders and would come dashing down a street filled with people, regardless of whose life they might put in danger.

"Mme. Curie was standing with a crowd of other people, including myself, awaiting admittance to a public building, when these horsemen appeared, riding madly, headed for the crowd. I got Mme. Curie to a place of safety just as they swept by. Sir William Thompson was also in the party."

Those who are familiar with the history of the telephone will recall that Sir William Thompson, then the foremost electrical scientist in the world, saw Bell's telephone at the Philadelphia Centennial in 1876 and was one of the first to offer encouragement to the then unknown young inventor.

We next discussed boats, with particular reference to the H.D.-4, the speed marvel built at Cape Breton by Dr. Bell and F. W. Baldwin for submarine chasing.

"People give me the credit for it," said Dr. Bell, "but, really, most of the credit for that boat belongs to Baldwin, and I wish you would say so in your story.

"By-the-by, Baldwin was the man who made the first public flight in America in an airship. It was called the 'Red Wing.' This is not generally known, however, and even when people do remember the name they get it mixed up with a Captain Baldwin who jumped out of a balloon or did some other circus trick.

"The H.D.-4 is a peculiarly shaped boat and when traveling at a high rate of speed is lifted clear of the water except for two blades. She has a speed of 71 miles an hour.

"I understand that another boat has made 74 miles an hour, but can do so only on a perfectly smooth body of water. Our boat can travel in the roughest seas."

The inventor of the telephone was also a student and experimenter in the science of aeronautics. From boyhood he believed in mechanical flight, and he was working on kite structures when Samuel Pierpont Langley visited him in Cape Breton in 1894. Dr. Bell was the sole witness, other than Langley's workmen, when the latter's machine was tried out at Quantico, Va., in May, 1896.

In 1907 Alexander Graham Bell formed the Aerial Experiment Association, with summer headquarters at Cape Breton. Associated with him were Lieutenant Thomas E. Selfridge, of the United States Army, F. W. Baldwin and J. A. D. McCurdy, two young Canadian engineers, and Glenn H. Curtiss, who was the motor expert of the association.

During the course of the experiments at the Cape Breton laboratory they built what Dr. Bell called a "tetrahedral kite" as big as a house.

I asked: "What is a tetrahedral?"

Dr. Bell produced a box of matches and inquired: "Can you make four triangles with six matches?" I tried for several minutes, but the best I could do was three triangles. Dr. Bell took the matches. Then he laid down three of them in the form of a triangle and stood the others up over them like a tent.

"There," he said, "are your four triangles, and there is your tetrahedral."

Lieutenant Selfridge, who was afterwards killed in an aeroplane accident at Fort Myer—the first victim of modern aviation—went up in one of the kites built at Cape Breton.

During the course of the conversation, Dr. Bell had occasion to refer to a notebook nearly filled with paragraphs in longhand. He wrote every day his observations and findings in connection with various experiments. These observations were frequently illustrated by drawings. When a book was filled those notes that he considered of sufficient importance were typewritten by his secretary and later bound in a permanent book.

We talked about Dr. Bell's estate at Cape Breton, Nova Scotia. On this estate of 800 acres Dr. Bell maintained his laboratory and conducted experiments on land and water and in the air, ranging from the breeding of twin-bearing sheep to researches in aerial locomotion.

The estate is located on Bras D'Or Lake. Dr. Bell told me that that part of the country was originally visited by the Spaniards, who called it "Labrador," meaning "place of the laborers." Evidently they had captured some of the natives and forced them to work. The French came along a little later and hearing the name pronounced took it for "Le Bras D'Or," which sounds almost the same but is written differently, and means "the arm of gold." A little later the English-speaking people came, and, seeing "Bras D'Or" written, pronounced it "Brass Door," by which name many of the natives now call the entrance to the lake.

While the interview was in progress, Mrs. Bell came into the room. Dr. Bell presented me and she spoke a few words with us. Many of the older telephone people know something of the romance of Dr. and Mrs. Bell—how the young professor of elocution, who was very much interested in helping deaf people to talk, met and married Mabel Hubbard, who had lost her hearing and consequently her speech as a result of scarlet fever when a small child.

Although he was 74 years old when I talked with him, Dr. Bell was active both mentally and physically, and whether describing a thing or listening to a question he showed keen interest, his whole face lighting up.

The great scientist was much interested in young people, and delighted in giving them experiments to try. He suggested several for me to pass along.

He said that children can be taught what things sink and what things float by providing a big tub of water and plenty of things to throw in it. The parent might ask, for example, if a piece of rubber will float. We might let the child see if a plate will float; sometimes it does and sometimes it doesn't. Let him push an empty tumbler, mouth down, into the water. The water will not enter it. Why? There is something inside which prevents the water from entering. Let him discover what it is.

The value of water as a sound carrier was demonstrated by Dr. Bell on one occasion when he sent a boy across the bay a mile away and had the lad strike two stones together under the water. Dr. Bell, on the other shore, with his head submerged, heard the sounds distinctly. He figured out that if two little stones tapped together under the water could be heard for a long distance, each tiny lobster that snips his claws must make an audible click, and he wondered if the creatures in the water signal to one another by sound.

Dr. Bell was a pioneer in what is now known as air conditioning. Ordinarily he spent the summer in Nova Scotia, but one year he was forced to remain in Washington during a period of extremely hot weather.

"I got to thinking about the matter," he told me, "and decided that if men could heat houses they ought to be able to cool them. You know, of course, that cold air is specifically heavier than warm air. You can take a bucket of cold air and carry it about in the summer time and not spill a drop, but if you make a hole in the bottom of the bucket the cold air will all run out. I began to think it might be possible to apply the bucket principle to at least one room and thus secure a place of retreat.

"Down in the basement of this house is a swimming tank. I let out all the water. I provided a refrigerator in another room at a higher elevation than in the tank, and in this were placed large blocks of ice covered with salt, and a pipe covered with asbestos paper was employed to lead the cold air into the tank.

"I sat in the tank and felt the cold air gradually rising. At last it went over my head—the tank was filled, and I found myself immersed in cool air.

"I could hardly believe, so cool and comfortable it was, that Washington was sweltering with the heat.

"I climbed up the ladder in the swimming tank until my head was above the surface and then found myself breathing a hot, damp atmosphere. Later I tried another experiment.

"I put the refrigerator in the attic and led the cold air downward through a pipe covered with asbestos. This was the very room. The doors were kept shut; the windows were open at the top. The temperature in the room came down to 65 degrees, and there was a delicious feeling of freshness in the air.

"It seems to me that some process might be found for cooling a whole city. There is a chance for some bright young man."

Dr. Bell was also of the opinion that we shall eventually learn to utilize the heat that is wasted every day in chimneys and by radiation. Several years before our conversation he made experiments with insulating materials and discovered that three or four inches of wool packed around a tank filled with hot water kept the water hot almost as long as if it had been in a thermos bottle. He also conducted experiments in heating water by means of a student's lamp.

A couple of pipes were led out of an insulated tank and placed in a hood over the lamp, effecting a circulation of water. The water heated by the lamp found its way into the tank and produced a sensible rise of temperature. This was continued from time to time for a number of days until it became evident that a cumulative effect was produced, and at last the water became too hot to hold the hand in.

At his house in Nova Scotia Dr. Bell connected an insulated tank with an iron pipe placed in the chimney in the hope of saving and utilizing some portion of the heat that escaped up the chimney. After he had the apparatus in use for some time he found that at any time of day or night he could be always sure of a warm bath from heat formerly wasted.

There is plenty of heat going to waste every summer, and Dr. Bell wondered why we do not use the roofs of our buildings for some other purpose than to keep off the rain. He said that on the wide expanse of roof available in all large cities for the utilization of the sun's rays, pipes containing oil or some other liquid could be laid and the liquid could be carried to an insulated tank and the heat conserved. Thus you could not only keep conserving and utilizing the heat that falls on the tops of the houses but effect some cooling of the houses.

Dr. Bell was a delightful man to talk with. Unconsciously I prolonged my stay. It was 1 A. M. when I left. Dr. Bell came down to the front door to say good-night and to extend an invitation to call again. Then and there I had another example of his sense of humor. I told him I would be glad to let him see what I was going to write. He laughed and said: "Oh, don't bother; I have been misquoted so many times that one more time won't make any difference."

(Read before the Society March 18, 1947.)